

3. *Xerus trivittatus*, Gray, Ann. & Mag. Nat. Hist. 1842, vol. x. p. 264.

Xerus getulus, Temm. Esq. 124?

Fur dark grey-brown, white-and-black-punctulated; vertebral line rather paler; throat, chest, streak on sides of back, and part of the sides white; belly nakedish, black: tail black-and-white-varied; hairs white, with three black bands.

Hab. North Africa, Morocco (Drummond-Hay). B.M., type.

The specimen in the Museum, which I described in 1842 as *X. trivittatus*, was said by Mr. Leadbeater, from whom it was obtained, to have come from India; but I have no doubt he was misled; and we have lately received living specimens direct from Morocco, some of which are preserved in the Museum. This species differs from *X. setosus* in the spines being thinner, shorter, less rigid, the vertebral line paler, the sides white, and the belly black. The black hairs are not so abundant, and they are not to be observed amongst the white spines that form the streaks.

XLIII.—*On some undescribed points in the Anatomy of the Limpet (Patella vulgata).* By E. RAY LANKESTER, Christ Church, Oxford.

At the late meeting of the British Association I drew attention to certain structures in connexion with the digestive and urinary apparatus of the Limpet which had not been previously recorded, and which have some importance as bearing on the general morphology of the prosobranchiate Gasteropods. Although I have not yet completed my drawings or fully worked out my notes, I am anxious to give here a brief record of their substance.

Since Cuvier's memoir on *Patella*, M. Milne-Edwards has written on the circulatory organs of that mollusk, and MM. Robin and Lebert have briefly noticed the generative organs, and other authors have paid attention to the nervous system. The points which I believe have been overlooked are:—

1st. The existence of an orifice on each side of the "head," in the angle formed by its junction with the muscular foot, and opening into the blood-sinus surrounding the pharyngeal viscera. These orifices I propose to call the capito-pedal orifices.

2nd. The existence of a pair of very large, orange-coloured salivary glands opening by four ducts (two on each side) into the buccal cavity.

3rd. The peculiar laminated "crop," like that of *Chiton*, resembling in structure the psalterium or manyplies of ruminants.

4th. The form, size, and structure of the renal organ; its communications with the exterior and with the pericardium.

5th. The absence of the oviduct described by Cuvier, or of any such organ. In this matter I can merely confirm MM. Robin and Lebert.

In working out these matters I have been most kindly aided by my friend and teacher, Prof. Rolleston. On my showing to him the capito-pedal orifices, and one or two other points, he investigated them further with me, and has given much of his valuable time and many suggestions towards confirming and elucidating these and other structures.

With regard to the capito-pedal orifices, it seems somewhat extraordinary that they have not been noticed by those very careful observers who confine their studies to the external characters of Mollusca. They immediately overlie the salivary glands, and are often coloured with an orange-red secretion, the origin of which is very obscure. The generative gland is in direct communication with, or, rather, lies in, the cavity into which they open; and they *may* serve as genital pores.

Of the salivary glands and crop I need say no more here. Cuvier did not find either of them; and probably those who have dissected *Patella* since have not directed their attention to the digestive tract.

The renal organ has never been properly described. It is a very large sac spreading between the liver and the muscular tunic or mantle, and in many parts dendroid or branching. It has two orifices, one on each side of the anus, which opens on the right-hand side into the open chamber formed by the extension of the mantle over the "head and neck" of the animal. Cuvier only recognized one of these orifices; and his error has not been corrected. Each orifice is placed on a little yellowish papilla, varying much in size and continuous with the substance of the large anal papilla. The papillal orifice nearer the median line is the smaller, and may be called the supraanal orifice; whilst that on the right hand is larger, and may be called the infraanal. These two orifices *represent two renal organs*, as in Lamellibranchs. The supraanal organ is very small and abortive; it lies in the superficial curve of the rectum, and is continuous around that portion of the intestine with the large infraanal or right kidney-organ. The orifice leads into a small cavity, with reticulated walls of a compact brownish tissue, perhaps contractile. The infraanal orifice leads into a great crescent-like sac which curves round the whole liver-mass, extending under it on the right side over the muscular foot-disk, but on the left side skirting the generative gland and terminating at the left anterior corner; it branches out dendritically

on the upper surface of the liver-mass, but does not completely enclose it. This sac has a dark greenish-brown pulverulent tissue, which is to a certain extent laminated; and from its orifice quantities of a dark powder can be forced. It is not improbable that water distends this sac when the limpet is in a state of expansion, and that the liquid which oozes from the animal when touched on its rock, exudes from the infraanal or supraanal orifice.

By most careful dissection, Dr. Rolleston and myself detected what appears to be a minute opening from the pericardium into the supraanal articulated sac, lying in the curve of the rectum. The orifice I found first by opening the pericardium, when it was seen between the bifurcation of the auricle at the right side of the cavity, and was then traced from both the pericardium and supraanal sac in other specimens.

Comparing this with Mr. Hancock's description of the renal organ of Nudibranchs, it is found that they differ chiefly in that *Patella* retains the double character of the organ to a greater extent than do the Nudibranchs; and this is what might be expected from the bilateral symmetry exhibited in other parts of its organization,—*e. g.* the capito-pedal orifices and the disposition of the gills. The small supraanal sac communicating with the pericardium may be compared to Mr. Hancock's "pyriform organ;" but it differs in having a separate communication of its own with the exterior, thereby retaining its character as the left half of Bojanus's organ. The infraanal or right sac and orifice, on the other hand, undoubtedly corresponds to the dendritic glandular sac and orifice of *Doris*, *Bornella*, &c. Any comparison of adult structures must, however, necessarily be very unsatisfactory in animals which have undergone such different modifications as Lamellibranchs, Prosobranchs, and Nudibranchs; and we can only guess at homologies until the development in each case is fully understood.

As to the absence of oviducts or sperm-ducts, I can most fully confirm MM. Robin and Lebert, Dr. Rolleston having most carefully tested my conclusions on this point before we had seen the paper of the French naturalists.

Reverting again to the capito-pedal orifices, I may just observe that their opening into a blood-sinus is not a little remarkable, calling to mind the discoveries of M. Lacaze-Duthiers as to orifices bringing water from the exterior into the branchial veins of *Tethys*, *Pleurobranchus*, &c. Whether such be their function, or whether, as seems most probable, they are genital pores, I cannot say. *Chiton*, which is allied to *Patella* very closely, forms a notable exception to the rule of an asymmetrical genital pore among Gasteropods, having two bilaterally sym-

metrical sexual orifices. The orange-coloured matter surrounding these orifices in *Patella*, and their position close to the mass of the salivary gland, is somewhat inexplicable, unless it should appear that part of the salivary gland is an accessory generative gland.

I have been induced to offer this abstract before proceeding to publish a fuller account, with drawings, as there may be a delay of some time in this; at the same time an opportunity may be obtained of correcting or adding to some of these notes.

XLIV.—*On the Structure of the Annelida; including a critical Examination of the most recent Works on this class of Worms.*
By E. CLAPARÈDE*.

A SOJOURN of five or six months at Naples, during the winter of 1866–67, enabled me to devote myself persistently to the study of the Annelida of its bay. The extraordinary richness of this sea surrounded me with an abundance of materials so great that I could not make use of the whole; and from the very first day I was convinced how erroneous is the opinion of M. Quatrefages † that volcanic shores are poor in Annelida. The poverty which has been detected here and there by that naturalist was certainly due to other causes than vulcanicity.

The Annelida of Naples have been on the whole but little investigated. They have, however, been more studied than is generally supposed. Delle Chiaje, with his indefatigable spirit of investigation, devoted to them many hours of observation. He has accumulated drawings upon drawings, often without taking the trouble to append to them any corresponding text. His publications were made with but little method or continuity. Moreover Delle Chiaje has been but little understood, and often misunderstood ‡. His works are inexhaustible quarries, from which the roughly squared blocks will only be slowly extracted. How many times have I thought myself in a position to publish entirely new facts, only to convince myself, by the careful exa-

* From the 'Bibliothèque Universelle, Archives des Sciences,' September 1867, pp. 1–44. Communicated by the author. Translated by W. S. Dallas, F.L.S.

This memoir forms part of the introduction to a work on the Annelida of the Bay of Naples, to be published under the auspices of the Société de Physique et d'Histoire Naturelle de Genève. This work, which is now in the press, will be accompanied by thirty-one plates in 4to.

† Histoire Naturelle des Annelés, tome i. p. 153.

‡ Delle Chiaje himself complains of having been misunderstood by Carus, Meckel, Wagner, Milne-Edwards, and Grube (*Descrizione e Notomia*, &c., 1841, tome iii. p. 69). Now-a-days he might still further enlarge this list.